

Space News **ROUNDDUP!**

TECHNICAL SERVICES DIVISION STARTS MOVING TODAY

Major Move To Clear Lake Begins February 20

Now, First Permanent Home A Reality After Five Years

When the move to the Clear Lake site is completed, the Manned Spacecraft Center will be in its first permanent home since its inception in October of 1958.

From its humble beginning of 45 people (35 from Langley Research Center and 10 from Lewis Research Center) it has grown to its present size without benefit of a place it could call home.

For over five years the Manned Spacecraft Center (formerly Space Task Group) has occupied borrowed or rented temporary quarters. The employees were never certain just how long their job would be in any one location and were unable to buy homes or make any long-range plans, but a majority of the original group "stuck-it-out" and are now here in Houston.

In a memorandum from Dr. Robert R. Gilruth to the staff on Feb. 25, 1960, it was stated that after completion of Project Mer-

cury, NASA Hq. has the intention to move the Space Task Group to Beltsville, Md. as an integral part of the Goddard Space Flight Center. No major move was anticipated at that time for two to two and one-half years.

May 1961, an official document proposed to establish a Manned Spacecraft Development Center when the program broadened to include Apollo, the manned lunar mission.

August 1961, a NASA site selection team toured possible sites for a permanent location for the Space Task Group. Some 20 cities were considered.

September 19, 1961, James Webb, NASA administrator, announced that the

(Continued on page 6)

Approximately 2100 Manned Spacecraft Center employees will move from locations in Houston and Ellington AFB to the Clear Lake Site from February 20 through April 6, and the remaining groups totaling about 500 personnel will be moved by July 1.

In addition to those moving to Clear Lake from Houston, some groups will move to Ellington AFB to space previously occupied by other MSC personnel.

Equipment moves from the various sites in Houston and Ellington AFB will begin earlier than the dates scheduled for personnel moves.

When the move is completed, over 2900 MSC employees will have been relocated at the Clear Lake site with an estimated 590 MSC personnel located at Ellington AFB.

In addition to these totals some 450 contractor employees will also be located at the Clear Lake site, and another 270 at Ellington AFB.

The next group scheduled to move to the new site

prior to the major move period is the Technical Services Division, during the period January 8-31. About 80 people are in this group which include shop and office personnel.

At the present time the total employees permanently located at Clear Lake numbers over 250.

The major personnel move will begin February 20, with Apollo Spacecraft Program Office moving from Office City to Bldg. 2, floors 6 and 7; Procurement Division (Apollo) from Office City to Bldg. 2,

floor 3; and Public Affairs Office (News Bureau) from the Peachey Bldg. to Bldg. 1.

February 28, the Personnel Division will move from East End Bank to Bldg. 2, floors 1 and 2; Civil Service Board from East End to Bldg. 1; Procurement Division from Ellington AFB Bldgs. 317, 318, and 323 to Bldg. 2, floor 3; Small Business from EAFB Bldg. 323 to Bldg. 1; Program Analysis and Resources Management Division from EAFB Bldgs. 212 and 316 to Bldg. 2, floor

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First Fuel Cell Delivery Called Apollo Milestone

The first fuel cells to provide onboard power and water for the Apollo spacecraft have been delivered to North American Aviation's Space and Information Systems Division, Downey, Calif. by Pratt and Whitney Aircraft of East Hartford, Conn.

Dr. Joseph F. Shea, manager of the Apollo Spacecraft Program Office at the Manned Spacecraft Center, said, "The delivery of these first fuel cells to California is one of the major milestones in the Apollo program, and brings us just that much closer to making the manned lunar mission a reality."

The prototype cells were shipped to S&ID after completing acceptance tests. North American is building the Apollo command and service modules under contract to the NASA Manned Spacecraft Center.

Fuel cells are miniature power plants--lighter and more efficient than conventional batteries--which will power guidance, communications, environmental controls and other electronic equipment aboard the moon-bound NASA space vehicle. The light cells can provide from 500 to 2,000 watts of power.

As a bonus, fuel cells produce water for the astronauts' primary drinking supply and to cool some of the spacecraft's components. Water is a byproduct of the chemical reaction by which fuel cells convert chemical energy to electricity.

Pratt and Whitney's fuel

cells for Apollo use hydrogen as fuel and oxygen as oxidizer. The three delivered this week have successfully undergone tests simulating conditions expected when the powerful Saturn V launch vehicle boosts the Apollo and its three-man crew to the moon. Three such fuel

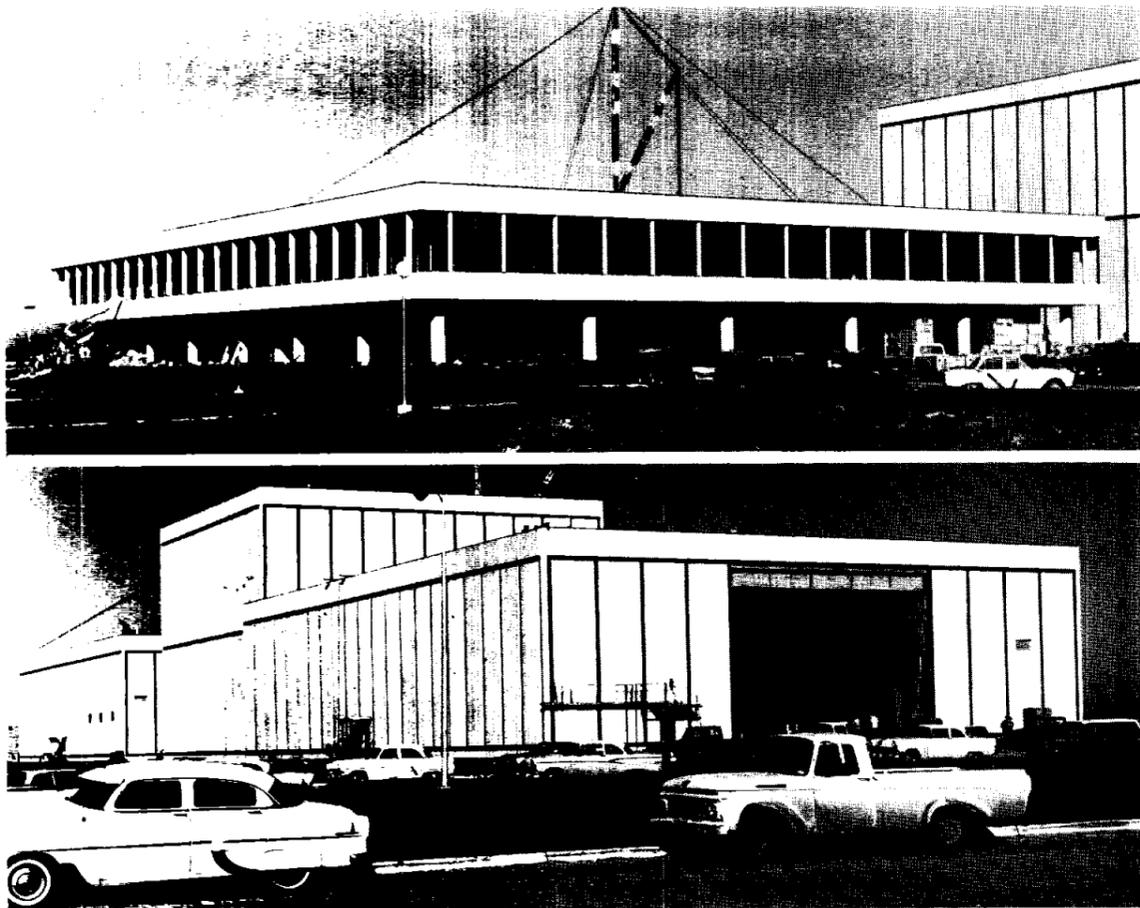
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U.S. Postmaster To Be Here Friday Tour MSC Sites

Visitors to the Manned Spacecraft Center this week will include Postmaster General John A. Gronauski who will be in Houston to take part in ceremonies connected with the issuance of the new Sam Houston postage stamp at the Rice Hotel, Friday, January 10.

Accompanying him from Washington will be Sen. Ralph W. Yarborough, Frederick Belen, assistant postmaster general and Ira Kapenstein, special assistant to the postmaster general for public information.

The group arriving on Thursday, will tour the MSC facilities on Friday and visit the temporary headquarters at the F & C Bldg., Ellington AFB, and the new site at Clear Lake.



TECHNICAL SERVICES MOVE--(Top Photo) The Technical Services Offices at Clear Lake looking N. W. (Bottom Photo) The Technical Services shop looking N. W. Beginning today and continuing through January 31, the Technical Services Division will be moving into these two structures at Clear Lake.

1963, A Year Of Achievement And Progress

The past year has proven to be very eventful for the National Aeronautics and Space Administration, the Manned Spacecraft Center here in Houston and the space effort in general. Some of the highlights of the year 1963 as reported in the pages of the ROUNDUP are presented for your information and reminiscence.

JAN. 9, 1963--The second annual Manned Space Flight Meeting of the American Institute of Aeronautics to be held in Dallas, April 22-24, will be co-sponsored by the Manned Spacecraft Center.

—MSC officials met with State Highway Commission officials from Harris and Galveston Counties to discuss road-net requirements and traffic problems anticipated at the Clear Lake site within the next several years.

—JAN. 23, 1963--A successful series of Gemini parachute design qualification tests is drawing to a close at El Centro, Calif. this week, with two more series to go before the 'chute system is qualified.

—Two California firms already involved in construction of the main portion of the buildings at the new MSC site at Clear Lake, were awarded the contract for the \$7.4 million Operations and Checkout Buildings at Cape Canaveral.

FEB. 6, 1963--President Kennedy's budget proposal to the Congress asked for an appropriation of \$5.712-billion for the National Aeronautics and Space Administration for fiscal year 1964.

—The Consuls of 19 foreign nations were the guests of the Manned Spacecraft Center at a special program arranged to familiarize them with the Center's activities and goals in space.

FEB. 20, 1963--Dr. Robert R. Gilruth, director of MSC was named, February 7, as a Visiting Professor of Aerospace engineering at Texas A & M College.

—Eight senior members of the Committee on Science and Astronautics of the U. S. House of Representatives paid an informal visit to MSC February 9.

MARCH 6, 1963--The Space Vehicle Panel of the President's Scientific Advisory Committee met at MSC Friday and Saturday for briefings and presentations on the Mercury, Gemini and Apollo programs.

—The ships Rose Knot and Coastal Sentry, two mainstays of the world-wide Mercury tracking network operated by Goddard Space Flight Center, have undergone modifications for the MA-9 mission and are ready for sea duty again.

MARCH 20, 1963--The National Aeronautics and Space Administration has signed a \$397,900,000 contract with the Grumman Aircraft Engineering Corp. of Bethpage, N. Y. to develop the lunar excursion module of the Apollo spacecraft.

—Secretary of Defense Robert S. McNamara arrived in Houston Thursday night after a 24-hour weather delay, to receive a brief-

ing on Project Gemini from MSC officials.

nauts during the last stages of Gemini flights, MSC has announced.

—The MSC Employees Activities Association was officially launched last Wednesday with the election of a nine-man Executive Board from among 23 district representatives of the General Assembly.

—A team of young engineers on MSC Cape Canaveral staff has come up with a highly advanced sys-

tems second-by-second throughout the journey.

MAY 15, 1963--The MA-9 flight of Astronaut L. Gordon Cooper was postponed when trouble developed in the Bermuda tracking station radar, a critical factor during launch and orbital insertion.

—The first drop test of the Project Apollo earth landing system was accomplished successfully by Northrop Corporation, El

that I am constantly amazed at is the public's response to this program...it is tremendously impressive," Astronaut L. Gordon Cooper Jr., told both houses of Congress and packed galleries on May 21. The parades and activities following each flight "Show that Americans want to express their feelings and their confidence that we... can conduct peaceful research programs; that we can conduct them openly, and under the surveillance of every man, woman and child in the entire world."

JUNE 12, 1963--The National Aeronautics and Space Administration will recruit 10 to 15 new astronaut trainees this summer, it was announced last week.

—The 16 astronauts spent two nights and three days in the jungles of Panama last week, part of a first-hand course in jungle survival that began with classroom lectures at the U. S. Caribbean Air Command's Tropical Survival School, Albrook AFB, Panama Canal Zone.

JUNE 26, 1963--Project Mercury, which successfully reached its goal May 15 with the day long flight of Astronaut L. Gordon Cooper, has drawn to a close. There will be no MA-10, it was announced June 12 by NASA Administrator James E. Webb, who said NASA will concentrate instead on the planned Gemini launches and on Project Apollo.

JULY 10, 1963--Astronaut M. Scott Carpenter will go aloft with a team of scientists in a jet airliner to observe the eclipse of the sun over western Canada July 20, it was announced last week.

—Dr. Robert R. Gilruth, director of the Manned Spacecraft Center was the principal speaker at the Space Age Symposium held in Shawnee, Okla. on June 29, in conjunction with the city's homecoming celebration for Astronaut L. Gordon Cooper.

JULY 24, 1963--Manned Spacecraft Center is scheduled to complete its move into the new Clear Lake complex by July 1, 1964. Complete plans for the move have been laid out in a Master Move Plan which has been published.

—The first launch vehicle specifically produced for Apollo program spacecraft testing was trucked last week to the White Sands Missile Range in New Mexico where its initial test flight is scheduled next month.

AUG. 7, 1963--An expected rise of almost \$1-million in the Manned Spacecraft Center's monthly payroll in



COOPER'S FLIGHT HIGHSPOINT—A dramatic peak was reached when Astronaut L. Gordon Cooper Jr., orbited earth 22 times, May 15-16. The flight was followed by millions of Americans throughout the 34-hour and 20-minute flight in his Faith 7 Mercury spacecraft.

tem of gathering, sorting, interpreting, displaying and storing electronic information which promises to be a major step forward in the pre-flight check-out of spacecraft.

—Lear Siegler, Inc. has delivered to NASA the slow scan television camera systems and receiving equipment which are intended for use on the forthcoming flight of Astronaut Gordon Cooper.

APRIL 3, 1963--The mighty Saturn launch vehicle ended phase one of its test program Thursday in the fourth straight successful test firing, demonstrating in the process that it can function with one of its eight engines dead.

—The contract definitizing the terms and conditions of Philco Corporation's role in implementing the Integrated Mission Control Center at MSC's site at Clear Lake was signed last week.

APRIL 17, 1963--A balloon shaped like a child's spinning top is being designed as a safety device for astro-

—The first NASA Saturn S-IV destined to fly in space left the Douglas Missile and Space Systems Divisions at Santa Monica, Calif., April 16 on the initial leg of its journey to Cape Canaveral.

—The astronauts making the United States' first two-man Gemini endurance space flight next year will be wired for sound as never before--to a pair of small magnetic tape recorders that will register their physical and mental reac-

Centro, Calif., May 3.

MAY 29, 1963--A host of last-minute hitches in otherwise smooth operations failed to keep Astronaut L. Gordon Cooper from his appointed rounds May 15. He made 22 of them, spent a day and a half in space, calmly accepted the failure of his electrical system late in the flight, and brought Faith 7 down by hand, a mile closer to the prime recovery ship, than did his predecessor, Astronaut Walter Schirra. When it was all over, he summed it up in two words: "it's great."

—MA-9 Pilot L. Gordon Cooper, Jr. returned to earth to be faced with a round of parades and related activities from Hawaii to Houston, Texas--via Cocoa Beach, Fla., Washington, D. C., New York City and the Newark, N. J. airport.

—"I think of all things

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Move

(Continued from page 1)

4; Technical Services Division from EAFB Bldg. 135 to Bldg. 8, floor 2; Engineering Division from EAFB Bldgs. 241 and 345 to Bldg. 8, floor 2; Facilities Division from EAFB Bldgs. 338 and 345 to Bldg. 8, floor 2; Legal Office from EAFB Bldg. 331 to Bldg. 2, floor 4; Office Services Division (Telecommunications Branch) from Houston Petroleum Center to Bldg. 2, floor 2; Office of Technical and Engineering Services from EAFB Bldg. 338 to Bldg. 2, floor 4; Flight Medicine Branch from EAFB Bldg. 431 to Bldg. 8, floor 1; Occupational Health Branch from EAFB Bldg. 339 to Bldg. 8, floor 1; Safety Branch from EAFB Bldg. 339 to Bldg. 2, floor 8; and Procurement Division (Control Systems) from HPC to Bldg. 2, floor 3.

March 4, the Security Division will move from East End to Bldg. 2, floor 1; Center Medical Operations from Farnsworth and Chambers Bldg. to Bldg. 2, floor 8; Credit Union from F & C to Bldg. 2, floor 8; Program Analysis and Resources Management Division (Control Room) from F & C to Bldg. 2, floor 9; Astronaut Office from EAFB Bldgs. 360 and 361 to Bldg. 4, floor 2; and Assistant Director for Flight Crew Operations from EAFB Bldg. 361 to Bldg. 2, floor 9.

March 6, the Director and

immediate office will move from F & C to Bldg. 2, floor 9; Assistant Director for Administration from F & C to Bldg. 2, floor 9; Assistant Director for Engineering and Development from F & C to Bldg. 2, floors 8 and 9; Assistant Director for Flight Operations from HPC to Bldg. 2, floors 8 and 9; Public Affairs Office (chief) from F & C to Bldg. 2, floor 8; Office of Administrative Services from F & C to Bldg. 2, floor 4; USAF Liaison from F & C to Bldg. 2, floor 8; Reliability and Quality Assurance Office from F & C to Bldg. 2, floor 8; Langley Liaison from F & C to Bldg. 2, floor 8; Langley Liaison from F & C to Bldg. 2; Program Analysis and Resources Management Division (Travel Voucher) (Travel Office) from F & C to Bldg. 2, floor 1; Crew Systems Division from Lane Wells to Bldg. 4, floor 3 and Bldg. 7; Gemini Program Office from VA Bldg. to Bldg. 2, floor 5; AFSC Field Office (Det. 2 SSD) from VA to Bldg. 2, floor 5; and Procurement Division from VA to Bldg. 2, floor 3.

March 11, Office Services (Graphics) will move from the Peachey Bldg. to EAFB Bldg. 338; Office Services Division from F & C to Bldg. 2, floor 2; Management Analysis Division from F & C to Bldg. 2, floor 8; Program Analysis and Resources Management Division from F & C to Bldg. 2, floor 4; Personnel Division (Training Branch)

from VA to EAFB Bldg. 212; and Public Affairs Office (Audio-Visual) from Minneapolis-Honeywell to Bldg. 1.

March 13, the Flight Crew Support Division will move from the Franklin Development to Bldg. 4, floors 1 and 2 and Bldg. 7.

During the period March 15-31, the Office Services Division (Telecommunications Branch) will move to Bldg. 2, floor 2 as required for a gradual buildup.

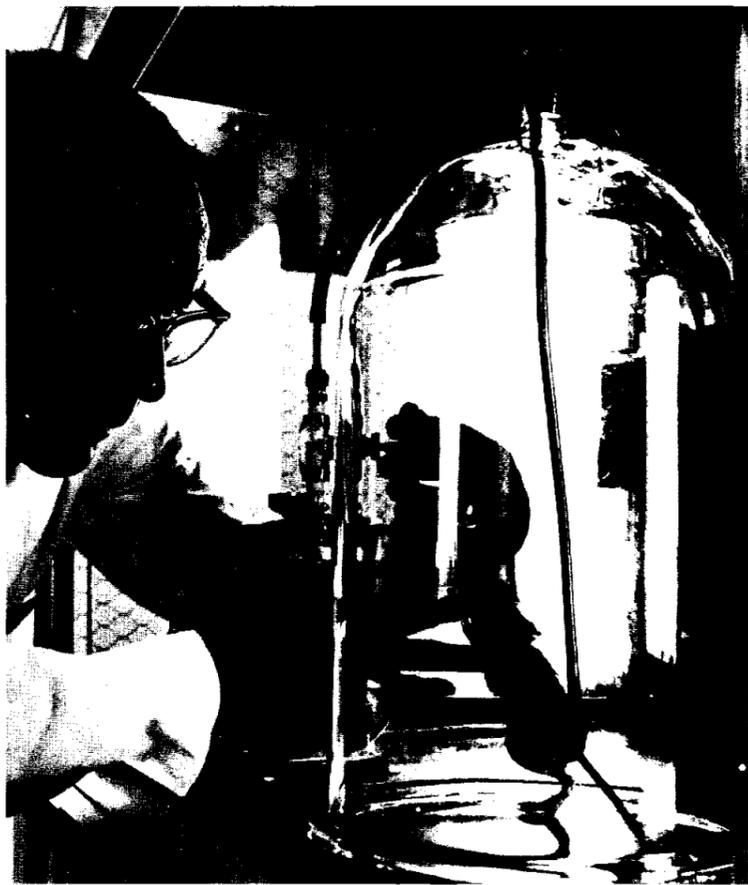
March 20, Advanced Spacecraft Technology Division will move from the Franklin Development to Bldg. 16; and Photographic Division from EAFB Bldg. 122 to Bldg. 8, floor 2.

March 27, Guidance & Control Division will move from the Rich Bldg. to Bldg. 16.

April 3, Structures and Mechanics Division will move from EAFB Bldgs. 319, 342, 343, 344, 356, 357, 358, 359, 135, and 333 to Bldg. 13.

May 15, the Instrumentation and Electronic Systems Division will move from the Rich Bldg. to Bldg. 15 at Clear Lake.

June 26, the final groups will move into their new quarters at Clear Lake. They are Ground Systems Project Office from Office City and IBM 6702 Gulf Freeway to Bldg. 30; Flight Operations Directorate from HPC, Stahl and Meyers Bldg., and Office City to Bldg. 30; DOD Gemini Support Planning Representative from HPC to Bldg. 30; and Telecommunications Branch from HPC to Bldg. 2, floor 2.



SPACE MEDICINE RESEARCH—Hardy Kangaroo rats, native to Southern California deserts, are breathing pure oxygen in Douglas Missile & Space Systems Division applied research laboratory to test the effect of prolonged inhalation of the gas on mammalian lungs. Douglas biochemist Dr. John K. Kirby, shown here adjusting oxygen flow into bell jar containing kangaroo rat, says the research is important in determining whether pure oxygen can be safely used for long periods by astronauts on space missions. In Mercury flights, astronauts have breathed the gas for short periods without ill effect. Three-day tests now under way will be followed soon by experiments lasting 90 days and then 180 days. Two groups of six rats, placed in bell jars, will breathe pure oxygen under a pressure of 5-7 pounds per square inch, simulating pressure inside a space vehicle. At the conclusion of the tests, the animals will be examined to determine if their lungs still can perform efficiently. Kangaroo rats were selected for the experiment because they do not require water for long periods. Because of this and because enough food (sunflower seeds) is put into the bell jars to sustain them, the long-term tests can be conducted without interruption.

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the next eight months was reported to space industry representatives attending the Second Space Industry Assistance Symposium in Houston on July 30.

—The National Aeronautics and Space Administration has named Dr. George E. Mueller to succeed D. Brainerd Holmes as head of the Manned Space Flight Program.

AUG. 21, 1963--A contract for \$934,000,000, the largest ever negotiated by NASA, has been signed with North American Aviation, Space and Information Systems Division, Downey, Calif., for the initial development and production of the Apollo spacecraft command and service modules.

—The first water drop test to qualify the parachute recovery system which will lower the two-man Gemini spacecraft to a water landing was completed successfully at Salton Sea, Calif., recently.

SEPT. 4, 1963--Vehicle testing for the Apollo program was successfully initiated last Wednesday morning at 9 a.m. (MST) when the first Little Joe II was launched at the White

Sands Missile Range in New Mexico.

—Gemini astronauts will learn how to "apprehend" another vehicle traveling in space on a special trainer in a darkened hangar-high structure now being erected at Manned Spacecraft Center's Clear Lake home.

SEPT. 18, 1963--In preparation for the two-man Gemini spaceflights, training of MSC's 16 astronauts in the techniques of parachute landings on land and water got under way at Ellington AFB last week.

—Construction of the NASA Manned Spacecraft Center at Clear Lake is 75 per cent complete, Center officials said last week, and the first large personnel move is scheduled for October.

OCT. 2, 1963--Beginning tomorrow, a two-day Project Mercury Summary Conference will be held here with a series of talks and technical papers to be delivered by 19 individuals who had a part in the Mercury space effort.

—James E. Webb, administrator of the National Aeronautics and Space Administration, visited the Manned Spacecraft Center this past week and con-

ferred with MSC officials.

OCT. 16, 1963--The first of the 13 spacecraft for Project Gemini was delivered recently by McDonnell Aircraft Corporation to NASA Manned Spacecraft Center officials at Cape Canaveral, Fla., for pre-flight checkout procedures leading to the first Gemini mission.

—Dr. Joseph F. Shea, the deputy director for systems at the Office of Manned Space Flight at NASA's Washington headquarters, has been named manager of the Apollo Spacecraft Office here at MSC.

OCT. 30, 1963--The Manned Spacecraft Center introduced America's 14 new astronauts to the world at a press conference held October 18 here in Houston, bringing to 30 the total assigned to the National Aeronautics and Space Administration's astronaut training center.

—Dr. George E. Mueller, NASA Associate administrator for Manned Space Flight named Dr. Walter C. Williams to be operations director for all manned space flight missions. James C. Elms, deputy director of MSC, will assume full responsi-

bility for general management of the Manned Spacecraft Center activities under Dr. Robert R. Gilruth, director of the Center.

NOV. 13, 1963--Reorganization of the Manned Spacecraft Center, aimed at strengthening the Apollo and Gemini program management structure, was announced here last week by Dr. Robert R. Gilruth, MSC director.

—In a three minute, 45 second flight at White Sands Missile Range, Apollo Boilerplate No. 6, last week completed the second consecutive successful step in the Apollo spacecraft escape system test program.

NOV. 27, 1963--Administrator James E. Webb, speaking on behalf of the National Aeronautics and Space Administration, after being notified of President Kennedy's death, said, "All of us in the National Aeronautics and Space Administration are shocked and deeply grieved at the untimely death of the President. No great nation in history, faced with a time of turmoil and change, ever had a leader more capable of seeing through to the opportunities which lay ahead.

We will sorrow with his family and continue to pursue his vision."

DEC. 11, 1963--Ten senior executives, representing NASA's major Apollo program contractors, visited the Manned Spacecraft Center in Houston last week for a briefing on the current status of Apollo.

—A revolutionary hydrogen-fueled Centaur rocket was used by the United States November 27 to orbit a five-ton, 28.5 foot long satellite that is visible to the naked eye as a white flash due to its tumbling action through space.

DEC. 25, 1963--Staff members of the Committee on Science and Astronautics, U.S. House of Representatives, visited the Manned Spacecraft Center recently and were given thorough briefings by MSC key personnel.

—Pictorially, construction progress at the Manned Spacecraft Center Clear Lake Site was presented; an artist's concept of the White Sands Missile Range, Apollo Support Facilities was depicted; and a series of photos showed the testing of the GT-I Spacecraft in Hangar-AF at Cape Kennedy.

MSC's Spacecraft Earth Landing Systems Develo

"The chute is out in reefed condition at 10,800 feet and beautiful chute! Chute looks good."

These words were spoken on February 20, 1962 by John Glenn, America's first astronaut to orbit the earth, as he descended to await pickup in the Atlantic Ocean east of Cape Canaveral (now Cape Kennedy).

The moment of parachute opening, beautiful to Glenn, was just as beautiful to the scientists and engineers who had designed and built the landing system at the Ventura Division of Northrop Corporation, more than 3000 miles away in California.

The fact that all Project Mercury astronauts returned home safely was only one example of the

technical excellence and reliability required by NASA throughout its difficult and complex space programs, now moving toward first flights of the two-man Gemini orbiting vehicle and, later, the Apollo flights to the moon.

It was an example also of the technological diversification and tight management controls which are continuing goals in the five divisions of Northrop Corporation, headed by Thomas V. Jones, President and Chairman of the Board.

Although advanced landing systems are centered in the company's Ventura Division, other Northrop contributions to the national space programs range from celestial guidance systems to the use of mice in space biology experiments.

Under contract to McDonnell Aircraft Corporation, Northrop Ventura now is developing the parachute landing system for Gemini, which will be used for long term earth orbital flights and to develop techniques for rendezvous and docking

of vehicles in space. The triple-parachute Apollo landing system is being produced by the Ventura Division under contract to North American Aviation's Space and Information Systems Division.

Force-Navy Parachute Facility at El Centro, Calif. More tests of both systems are scheduled before they are considered to be fully man-rated.

Northrop's work in the recovery of men and ma-

logistics purposes.

The Gemini and Apollo earth landing systems utilize enlarged versions of the Ringsail Parachute, a Northrop invention applied to the Mercury program. At the same time, applied research is moving toward landing systems of the future.

One new device is the Aerosail parachute which has demonstrated steerable gliding capabilities. Another is Skirtjet, a solid propellant rocket which would fire downward through a continuous slot nozzle around the base perimeter of a spacecraft. Utilizing the ground effect principle, Skirtjet would be suitable for final landing on the Earth as well as other bodies, such as the Moon, which have little or no atmosphere.

Skirtjet, in combination with parachutes, is seen as a promising method for earth landing of shuttle vehicles which will carry men and supplies to and from a manned orbital space station. The combination also is proposed for the recovery of large rocket booster stages. Now under study are devices for soft landing instrumented space probes on the planets Mars and Venus.

In support of man's advance toward the moon and planets, Northrop Space Laboratories, another of Northrop's five divisions,

is studying methods for analyzing the moon's surface, basic understanding of space radiation and physical properties of lunar and planetary materials.

In life sciences, NSL is exploring the cultivation of marine algae for food and oxygen during prolonged space flight and investigating the effects of ionizing radiation on biological material. In a program sponsored by the Atomic Energy Commission, Northrop is studying native pocket mouse population around the Nevada bomb test site to determine residual radiation effects.

Northrop Space Labs is providing industrial support to the Jet Propulsion Laboratories on NASA's Ranger unmanned lunar exploration programs.

The critical technology of navigation and guidance in space is a strength of Northrop's Nortronics Division. Sun and earth sensing equipment, built by the company, operated successfully throughout the 109-day journey of the Mariner spacecraft which passed within 21,600 miles of the planet Venus in December 1962.

As an outgrowth of the Q-Ball sensor, developed originally for NASA's X-15



THOMAS V. JONES

Chairman of the Board, president, and chief executive officer of Northrop Corporation.



GEORGE F. DOUGLAS

Northrop Corporation vice president and general manager, Ventura Division.

chines from flight is an outgrowth of more than 25 years experience at Ventura Division (formerly Radioplane Company) in the production of radio-controlled pilotless aircraft for gunnery and missile targets. Automatic parachute recovery of target drones provided the experience necessary for recovering men from space.

Northrop Ventura continues as a major producer of small, radio-controlled aircraft for target, surveillance, communications, and



BERT A. ENGSTROM

Project manager for the Gemini Parachute Landing System at Northrop Ventura.



GEMINI TEST LANDING-Gemini test spacecraft (top) just prior to water impact at Salton Sea, Calif. The vehicle touches the water (center) and is shown at water impact (bottom).



CLOSE-UP of Northrop Ventura's 84-foot Ringsail parachute used to recover the two-man Gemini spacecraft, is shown here as it was spread out on the desert at El Centro, Calif. after a successful drop test of the landing system.



TRIGA NUCLEAR REACTOR, now in operation at Northrop Space Laboratories, simulates natural and induced radiation which men and equipment will encounter in space.

ed By Northrop Ventura

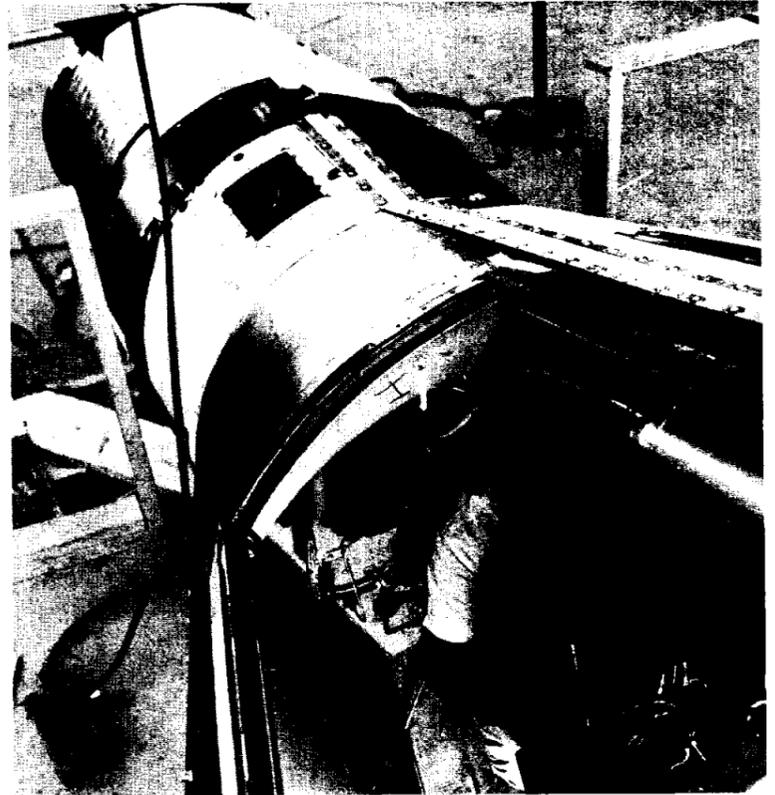
rocket research vehicle, the company is investigating methods for measuring angle of attack while space vehicles are traveling through the upper fringes of the Earth's atmosphere. Northrop Corporation is headquartered in Beverly Hills, Calif. The company's five divisions are located in the Los Angeles area, including the largest, Norair, which produces the T-38 supersonic trainer, F-5A fighter and F-5B fighter-trainer. The corporation, with approximately 20,000 employees, has plants and facilities in five states and the District of Columbia with activities abroad in 14 coun-

tries. Northrop Ventura, headed by George F. Douglas, vice president and general manager, occupied new facilities in the Conejo Valley at Newbury Park, Calif. in January 1963. Operations previously were in Van Nuys. The Division now is integrated within a three-building complex providing 378,000 square feet of engineering, manufacturing and administrative floor space. Some 1800 people are employed in the plant which was built on a scenic 50-acre site and designed to accommodate up to 3000 employees. As a by-product of pilot-

less aircraft development, Northrop Ventura has built strong capability in the manufacture of plastics and electronic components. In addition to advanced landing systems, research is delving into specialized nuclear and electronics areas, particularly to determine the effects of nuclear radiation upon electronic components.

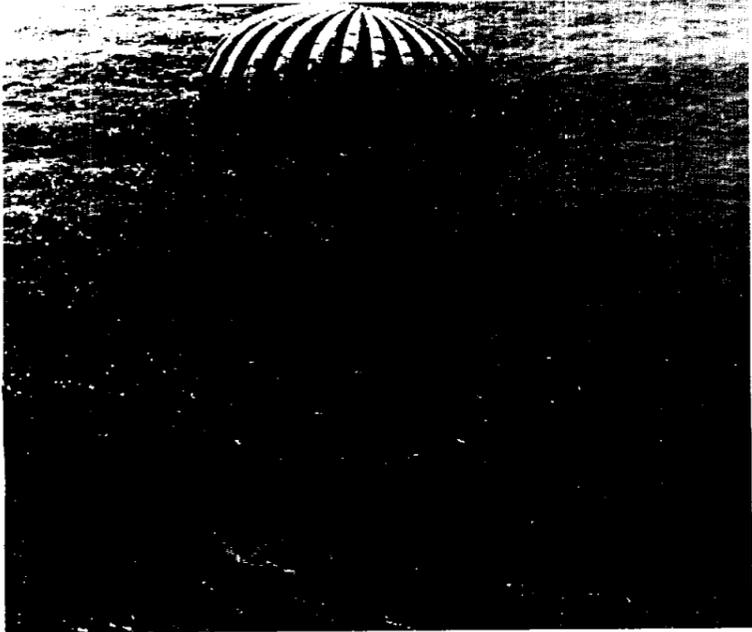


WILLIAM H. FREEMAN
Project manager for the Apollo Earth Landing System at Northrop Ventura.

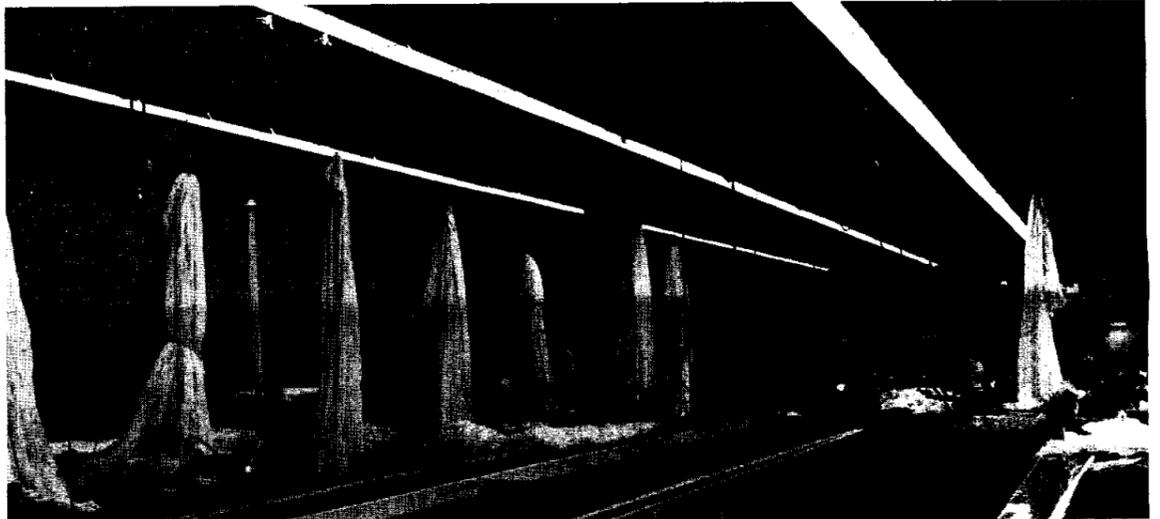


A NORTHROP VENTURA test engineer is shown installing electronic gear in a Gemini drop test vehicle. The electronic components will measure the descent velocity of the test spacecraft, parachute opening shock loads, landing impact, aid in tracking, along with other technical data necessary to qualify the Gemini parachute landing system.

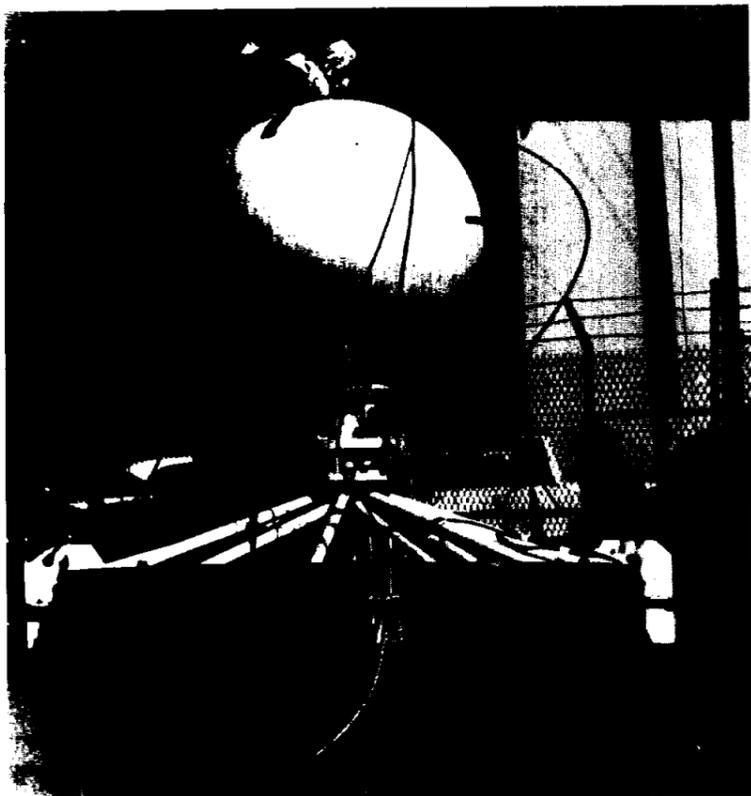
EDITOR'S NOTE: This is the nineteenth in a series of articles designed to acquaint MSC personnel with the Center's industrial family, the contractors who make MSC spacecraft, their launch vehicles and associated equipment. The material on these two pages was furnished by the Public Relations Office, Northrop Corporation.



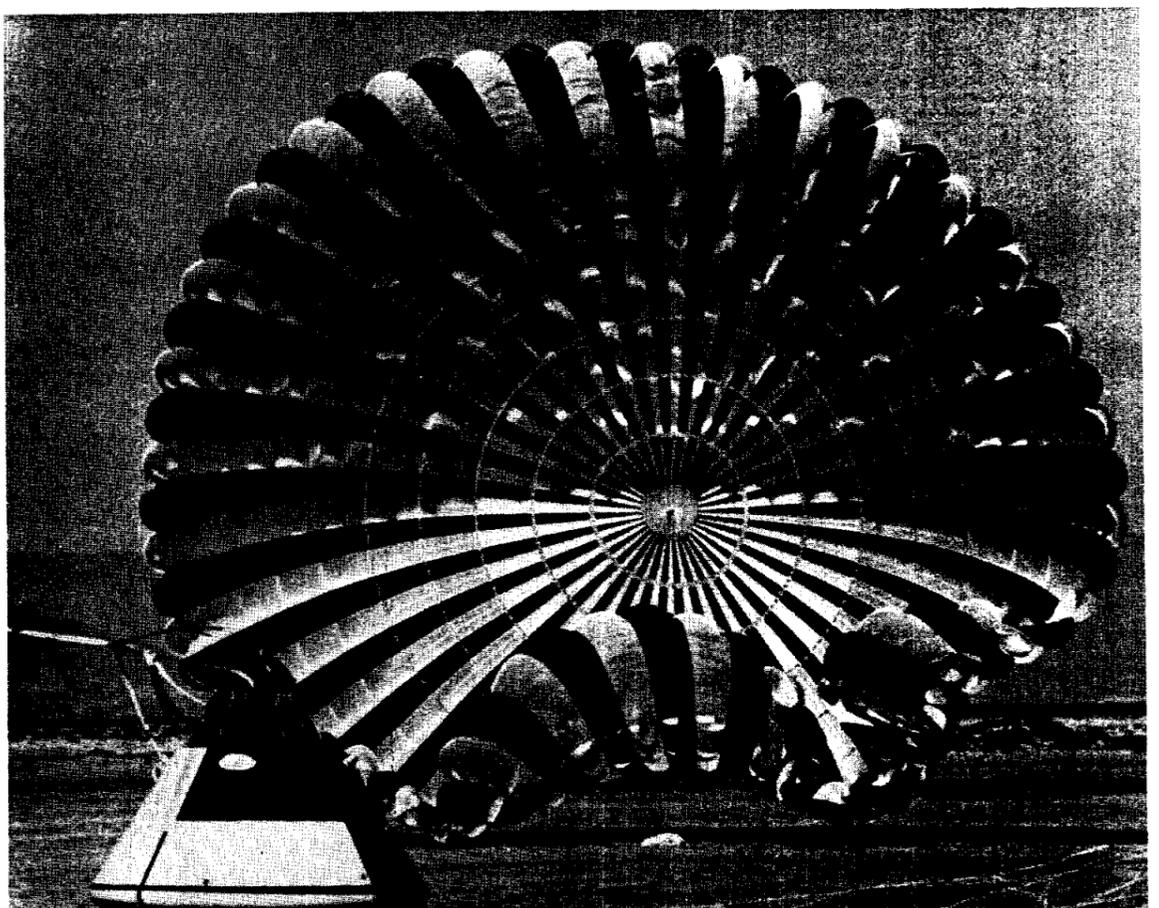
MERCURY IMPACT—All Project Mercury astronauts were safely returned to earth by a landing system identical to the one shown here. The Mercury spacecraft utilized a 63-foot main Ringsail parachute designed and developed by Northrop Ventura.



PARACHUTE FACILITY—Huge tables like the ones seen here are utilized by Northrop Ventura technicians to inspect and pack the parachutes used to land NASA's manned spacecraft. The above photo shows Northrop Ventura's chute manufacturing facility at El Paso, Tex.



RETROCKET LANDING—Northrop Ventura's advanced research and development of landing systems for future manned spacecraft termed the 'White Spider' above. It is a test device retrorocket which utilizes a skirt-like power plant to lower itself gently to the ground.



APOLLO CHUTE TEST—One of the three Apollo earth landing system parachutes begins to furl just after a successful drop test on the desert at El Centro, Calif. Each chute in the Apollo landing system is the size of the average residential backyard.

The SPACE NEWS ROUNDUP, an official publication of the Manned Spacecraft Center, National Aeronautics and Space Administration, Houston, Texas, is published for MSC personnel by the Public Affairs Office.

Director Robert R. Gilruth
Public Affairs Officer Paul Haney
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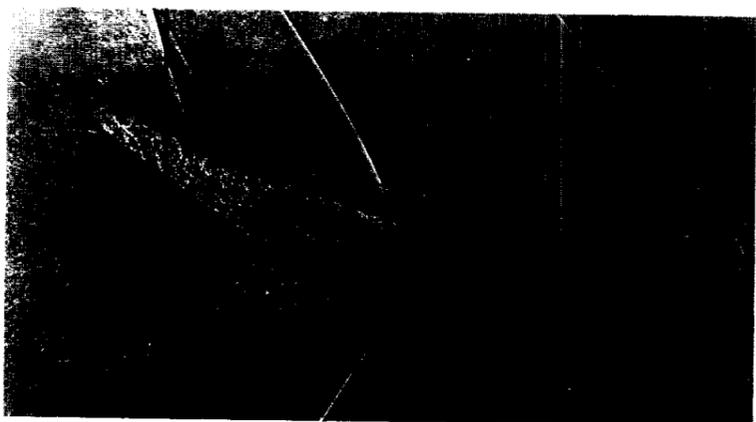
A Message To Federal Employees FROM THE PRESIDENT

In these first days, men and women of all ranks within the government have asked me, "What can I do to help?" Many more of you, deeply committed to the Federal service, are undoubtedly asking yourselves the same question. It is impossible for me to make a direct and personal response to all of you, much as I would like to do so. Yet there is an answer which I would like to express to every employee in every agency at every location in the Federal Government. It is simply this: "Give your best to your job and your country."

As your Chief Executive, I will do my utmost to maintain the high quality and character of the career service in the government and to advance its usefulness through improvement. I will look to those who direct the day to day activities of this great work force and to the Chairman of the Civil Service Commission for continuing reports and recommendations to assist me in this purpose.

We have a great resource of abilities and talents among the people serving our Federal Government. We have career systems to assure continuity of people and programs. We are organized for the job and the work is before us. President Kennedy did not shrink from his responsibilities, but welcomed them, and he would not have us shrink from carrying forward the great work he began so well. I say to you as I said to the Congress: "Let us continue."

Lyndon B. Johnson
President of the United States



WAVES OF THE FUTURE—Testing the model of an Apollo Launch Escape Vehicle produces these shock waves created by the vehicle traveling at supersonic speeds. From experiments like these, at Ames Research Center near San Francisco, Calif., NASA scientists determine whether the vehicle will carry space-bound astronauts safely away from the booster if it misfires during launch.

Apollo

(Continued from page 1)

cells will be used in each Apollo spacecraft.

Pratt and Whitney, a division of United Aircraft Corporation, is under separate contract to Grumman

Aircraft Engineering Corp. to develop smaller fuel cells for use aboard the Lunar Excursion Module (LEM). The LEM will land two of the three astronauts on the moon's surface, then rejoin the orbiting command module under its own power.

WELCOME ABOARD

During the period from November 15 through December 22 a total of 14 persons joined the Manned Spacecraft Center. Of these, 11 were assigned here in Houston and one each to White Sands, N.M., Cape Kennedy, Fla., and St. Louis, Mo.

ASSISTANT DIRECTOR-ATE FOR ENGINEERING AND DEVELOPMENT: Hartley Akin Soule.

ASSISTANT DIRECTOR-ATE FOR FLIGHT CREW OPERATIONS: Donald K. Slayton.

TECHNICAL SERVICES DIVISION: Edwin L. Shropshire and Inocencio M. Cortez.

WHITE SANDS MISSILE RANGE (White Sands, N.M.): Robert C. Gibson.

ASTRONAUT OFFICE: Russell L. Schweickart.

OFFICE SERVICES DIVISION: Peggy J. Garner, Leavie I. Needham and Margaret E. Chambers.

SPACECRAFT SYSTEMS BRANCH: Betty L. Andricks.

FLIGHT OPERATIONS DIVISION: Jack Foster.

PRE FLIGHT OPERATIONS DIVISION: Ronald Engel.

PERSONNEL DIVISION: Donna D. Alberts.

GEMINI PROGRAM OFFICE: Alvin H. Bock Jr.

Home

(Continued from page 1)

new NASA center for manned space flight would be constructed upon a 1,000-acre site donated by Rice University, southeast of Houston, in Harris County, Tex. The Space Task Group would move from Langley Field to Houston, Tex.

October 13, 1961, NASA Hq. approved construction projects for a permanent manned spacecraft center installation at Clear Lake. Buildings to be constructed included an auditorium, project management, cafeteria, flight operations and life systems, life systems laboratory, technical services, technical services shop, central data processing, structures laboratory, research and development offices and laboratory, equipment evaluation laboratory, support offices, support warehouses and offices, and project test laboratory.

November 1, 1961, the Space Task Group was redesignated the Manned Spacecraft Center, with Robert R. Gilruth as director.

January 1, 1962, a survey was performed at the Manned Spacecraft Center to ascertain the number of personnel who intended to

MSC PERSONALITY

Job Of Spacecraft Retrieval Guided By Robert Thompson

Being in the right spot at the right time is of prime importance in the speedy recovery of a downed spacecraft and its occupants, and the job becomes an immense one when you have to deploy people and equipment over a major portion of the earth.

This is the job that is directed by Robert F. Thompson and the Recovery Operations Division of which he is chief.

When a flight is planned, his group decides what the Manned Spacecraft Center will need in recovery support around the world and they then work with the Department of Defense in providing the necessary support in ships, planes, equipment and deployment of personnel.

Thompson joined MSC (then the Space Task Group) in January of 1959 at Langley and was named as head of the Flight Operations Division's Recovery Branch, with responsibility for recovery support of all MSC flight activities.

In early 1962 he was named assistant chief for Operational Support, Flight Operations Division with the responsibility for both the Recovery Branch and the Operations and Evaluation and Test Branch.

Thompson's present title as chief of the Recovery Operations Division became effective Nov. 1, 1963, and in this capacity he and his group support all MSC flight operations in the recovery phase and supply recovery support for all manned and unmanned flights.

His group has the responsibility for operational testing and making the arrangements for the test area as well as directing and coordinating all groups involved.

Very little of the planning by this division for a manned flight is ever brought to the attention of the general public because as it ends up each time, only one ship is needed to make the pickup and the remaining recovery forces do not enter the limelight.

As Thompson put it, "About 99 per cent of the planning which we make for recovery or the unexpected is made with the

move with the Center from Langley Field to Houston, Tex. Only 84 personnel indicated they would not make the move.

July 1, 1962, the relocation of the Manned Spacecraft Center from Langley Field to Houston and more temporary quarters was completed. This time they could look forward to an eventual permanent location.

hope that we will never have to use it, but if we do have a need for it, we know that it is available and ready."

Thompson said that recovery actually begins



ROBERT F. THOMPSON

when the vehicle leaves the pad and continues until the spacecraft has landed and been retrieved along with its crew.

A native of Bluefield, Va., he completed his early schooling there and entered Virginia Polytechnic Institute, where he received his BS degree in aeronautical engineering in December 1944.

He served as a line officer in the U.S. Navy from January 1945 until September 1946.

In March of 1947 he joined the NASA Langley Research Center science staff and was assigned to Langley's 7 x 10-foot Wind Tunnel for stability research. While doing work in the wind tunnel on various aircraft components and configurations, he did considerable work in aircraft aerodynamic controls and the study of control flutter phenomena.

After 12 years of work in this field he transferred to the Space Task Group (now MSC).

Thompson is married to the former Dorothy Pritchett, also of Bluefield. The couple has two children: Cynthia Jean 14, and Keith T. 4, and they reside in the Timber Cove section of Seabrook, Tex.

Thompson says he likes this section of the country because there are so many more days of the year that a person can participate in outdoor activities. He has taken up the game of golf since coming to Texas and when time permits he takes to the links.

'Old MCC' At Cape Refitted With Gemini Mission Simulator

During the lifetime of Project Mercury, one of the best-known buildings in America was Mercury Control Center at Cape Kennedy (then Cape Canaveral). The operations room of this building was the nerve center of manned space flights, and, in this building "Go No-Go" decisions were made as the flights progressed.

With the close of Project

habilitated with much additional space devoted to the Gemini Mission Simulator.

Today, work in that phase of the center is rapidly approaching an operational status and before too much time has elapsed the 30 astronauts now assigned to Manned Spacecraft Center and the National Aeronautics and Space Administration will be flying simulat-

Delivery of the crew station from McDonnell Aircraft Corporation in St. Louis, Mo., was made just before Christmas, and it is estimated that the training device will be operational in six to eight weeks after the delivery date. Following a shake-down of six more weeks, personnel will be able to start making rehearsal tapes in preparation for being tied in with

Control Company DDP-24.

The crew station will be installed on the actual floor of the room. The 17-foot-long device will be installed in an 18-foot-long space, and the two ton station will have a limited amount of maneuverability in place. During simulated missions, the nose will be tilted 32 degrees from the vertical which will permit the astronauts to complete such tests in a semi-reclining position, rather than having their legs higher than the rest of their bodies.

The instructor display will include repeaters of all spacecraft displays, an orbital position indicator (moving map of the world) and three television screens (one showing the instrument panel in the crew station and one showing the face of each pilot). All systems in the training device can be malfunctioned, either by the instructor or by programming the computers.

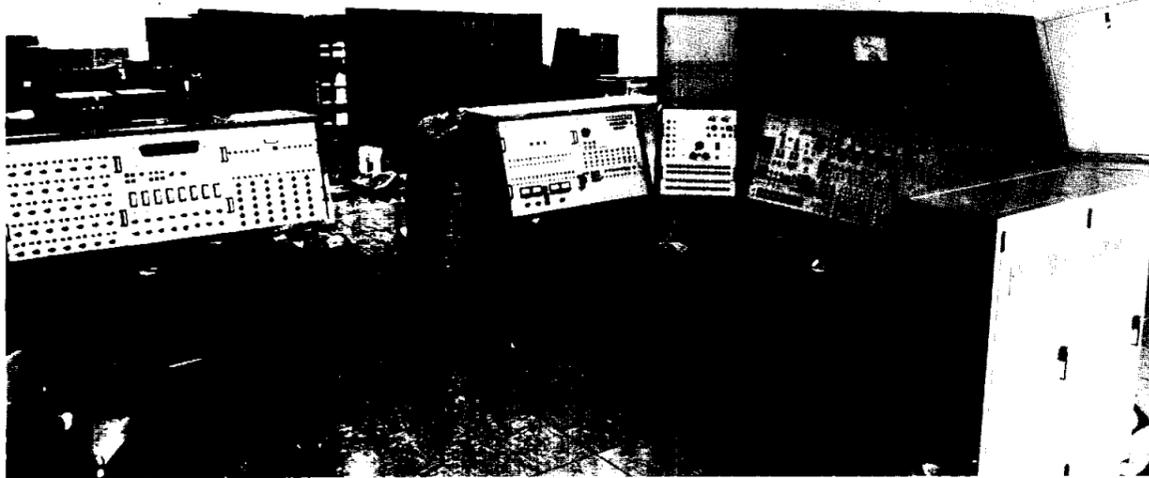
When flying missions not tied into the network, the instructors work from mission plans developed in collaboration with personnel of the spacecraft operations branch. Pilots and instructors may work for an hour or more, stop and discuss problems and techniques, then re-run the mission. It is during such missions that the instructors really "have their day in court." If the pilots seem to be having too easy a time as a result of having done their homework well, the instructors insert malfunctions not included in the script and favorable response to such situations by the pilots may lead, at times, to the insertion of several malfunctions simultaneously. Under circumstances such as these, Hand says the astronauts may legitimately claim a "foul."

Network simulation represents a more complex situation because the simu-

lator now furnishes telemetry and trajectory data for the Mission Control Center (and the range stations by means of pre-recorded tapes). Mission plans for these simulations are prepared by personnel of Manned Spacecraft Center's Flight Operations Division and checked with instructors to insure that the various emergency situations desired may be programmed, either through the computers or by the instructors, in order to determine the reaction of the pilots or flight controllers to specific problem areas. With a choice of more than 300 individual items which may be malfunctioned there are a few emergencies beyond the capabilities of the simulator.

The simulator facility at Mission Control Center will be utilized throughout Project Gemini. Additional simulators for Apollo missions - the command module simulator and the lunar excursion module simulator - will be housed in the Operations and Checkout Building of the Merritt Island Complex. This will require that the personnel of the group split their time between the two sites. Hand says that the NASA personnel will be augmented by contractor programmers, engineers and technicians. At the present time, in addition to Hand, members of the flight crew support group at the Cape are Riley McCafferty, John Mitchell, Joseph Kolnick, Lloyd Rackley, Edmund Jones, Harold Condon, and Lola Morrow.

An additional simulator facility will be installed this year at Manned Spacecraft Center's Clear Lake, Texas, site. This simulator will be manned by Houston counterparts of the Florida group. The Flight Crew Support Division is directed by Warren C. North.



GEMINI MISSION SIMULATOR—Designed and built by the Electronic Equipment Division of McDonnell Aircraft, the Gemini Mission Simulator will provide astronauts and flight operations personnel with realistic mission simulation prior to launching of the two-man Gemini spacecraft. Workmen began installing the equipment in the Mission Control Center at the Cape recently.

Mercury much of the equipment in Mercury Control Center became obsolete, its purpose served. Among this equipment was the procedures trainer and the related items utilized by the Mercury astronauts and their instructors in hundreds of hours of training while flying simulated flights either linked up with the Mercury world-wide network or on specific mission phases such as abort situations.

This part of Mercury Control Center, little known to the public, was housed in a 20 x 40-foot room. With the close of the first manned space program, immediate steps were taken to convert that building to fit the requirements of Project Gemini, and Mercury Control Center became Mission Control Center, and as such, was re-

ed missions in the new facility.

When completed, visitors to the site will enter the 40 x 85-foot simulation room and will see the crew station (formerly known as the procedures trainer), an instructor console, a telemetry console, and two computers. At a later date, visual display equipment will be installed. In addition to this space, an area for offices, shops and storage has been provided for this important phase of activity.

What visitors will not see is the maze of wires beneath the false floor of the Gemini Mission Simulator. Arthur A. Hand, chief of MSC's Flight Crew Support Division's Cape Kennedy contingent, revealed that more than a million feet of wire will be located beneath that floor.

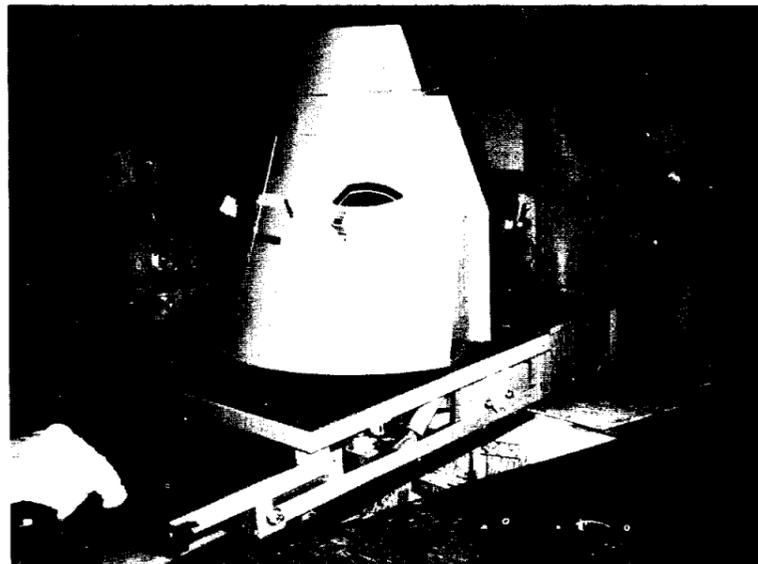
the world-wide network through the Goddard Space Flight Center, probably about July 1964 when simulated flights for the manned Gemini missions will begin.

In order to maintain proper temperature, 15,000 cubic feet of conditioned air per minute must be furnished to flow through the equipment in the room. For this purpose, air conditioning equipment with a capacity of 360,000 British thermal units per hour has been installed.

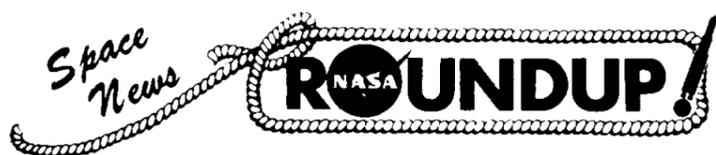
Hand stressed that elaborate precautions have been taken to insure that an adequate power supply is available at all times. A 60-kilowatt motor generator with standby diesel engine is located in an adjacent building and is tied in to the systems in such a way that in the event of a failure in the normal supply of commercial power, it will continue the needed requirements on a split-second basis. Hand pointed out that it would be impossible to estimate the extent of trouble which would result from a power failure during a simulated mission, especially one in which the Gemini Mission Simulator is tied into the network. A failure under such conditions would not only completely foul-up the computer memories but also require that the entire problem be re-established all over the network. He said that there are about 1,000 miles of wire in the two computers to be used in the facility - a Link Mark I and a Computer



REMOVABLE FLOOR—Homer Smith, and M. B. Kerr, both McDonnell employees check the connections of a cable panel box housed under the floor of the Gemini Mission Simulator at Cape Kennedy.



CREW STATION—Workmen position the "fixed-base" crew station simulator in the 18-foot-long space. The training device is 17 feet long and weighs about two tons. No motion cues are provided in the simulator, however, the simulated spacecraft can be tilted to change position and relieve pressure points for astronaut comfort.



SECOND FRONT PAGE

LEM Environmental System \$8-Million Contract Awarded

The Grumman Aircraft Engineering Corporation, prime contractor to the NASA Manned Spacecraft Center for development of the Apollo program lunar excursion module (LEM), recently awarded an \$8,370,000 contract to the Hamilton Standard Division of the United Aircraft Corporation to design, develop and produce the en-

vironmental control system (ECS) for LEM.

The ECS will perform two primary functions--life support and thermal control.

The life support function includes the pressurization and ventilation of the cabin and crew's space suits. It will also provide for the removal of contaminants such as carbon dioxide, odors, excess water vapor and particle matter from the atmosphere breathed by the crew.

Local Firm Will Build Space Test Chamber At MSC Clear Lake Site

NASA has awarded a \$272,522 contract to S.I.P., Inc. of Houston to build and install a space environmental chamber and associated equipment at the Manned Spacecraft Center's Clear Lake site for use in thermochemical tests.

The chamber will be for study of propellant equipment, heat rejection and energy collecting devices under simulated space conditions over long periods.

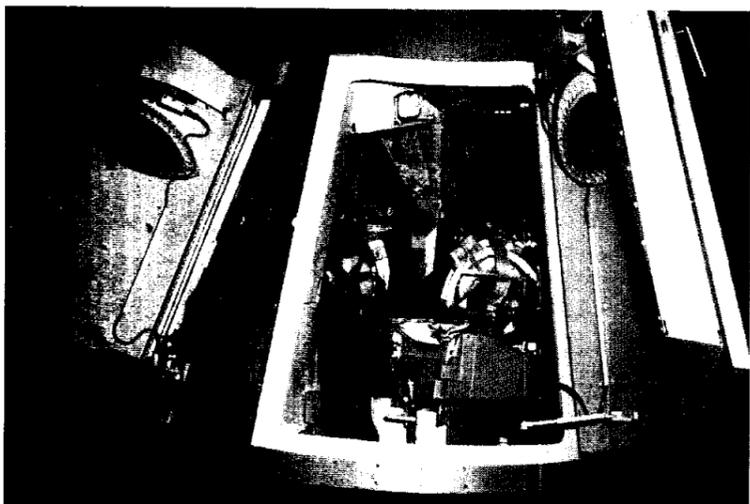
The chamber will look like a bathysphere on stilts. It will stand more than 22 feet tall including the four steel support columns. Inside dimension of the unit will be 15 feet.

A special feature of the space chamber will be the installation of burst discs. These are safety valves which rupture in the event of equipment failure during testing.

Equipment to be tested will be placed in the chamber by means of a removable monorail system.



DEPUTY DIRECTOR APOLLO PROGRAM—Air Force Brig. Gen. Samuel C. Phillips, has been named deputy director of the Apollo Program in the Office of Manned Space Flight, Washington, D. C., effective January 15. General Phillips, now vice commander of the Air Force Ballistic Systems Division, will join some 200 other military officers serving in key posts with NASA.



EXACT GEMINI REPRODUCTION—The crew station in the Gemini Mission Simulator at Cape Kennedy is an exact reproduction of the interior of the Gemini spacecraft. Size, configuration, color, seats, entrances, and windows are exact replicas. In addition, displays, meters, switches, lights and controls are identical in appearance, feel and operational characteristics to those of the actual spacecraft.

Astronaut Cooper's Spacecraft Faith 7 Continues Tour Of Nation This Week

The spacecraft of Astronaut L. Gordon Cooper Jr., Faith 7, will continue its tour of the state capitals of the United States this week and the first stop in 1964 will be in Nashville, Tenn., where it will be on display Thursday through Sunday.

Inside and out, the spacecraft is as it was when it splashed down in the Pacific near Midway Island on May 16, 1963. A viewing window has been installed and cutaways of the heat shield and outer skin have been made for viewing the inner structure.

The outer skin of the spacecraft, made of a new metal rene' 41, shows the effects of the 1,000 degree heat created by friction during the re-entry of the spacecraft into the earth's atmosphere. The heat shield, a mixture of glass fibers and resin, at the base of the spacecraft withstood maximum temperatures of 3,000 degrees Fahrenheit.

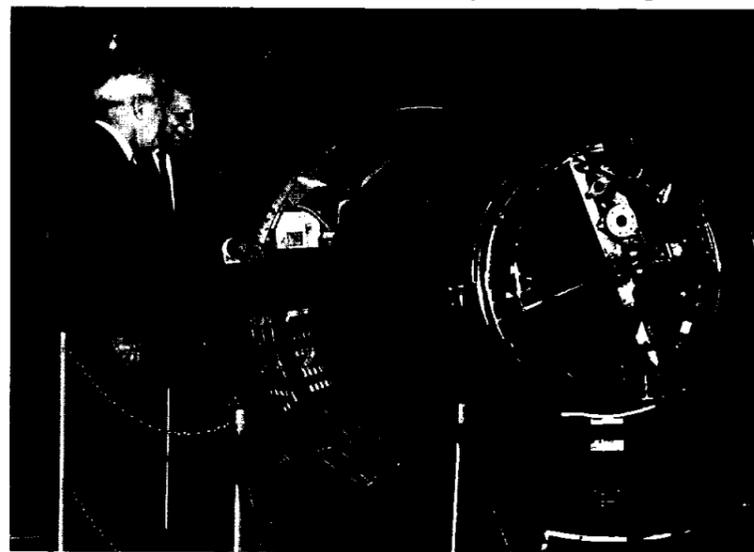
Cameras Cooper carried, along with the astronaut Survival Kit which rode on Faith 7's 546,185 mile earth-circling flight, will be on display. Samples of the types of food Cooper ate during flight will also be displayed.

Schedules for the appearance of the spacecraft during 1964 are as follows:

Nashville, Tenn., Jan. 9-12; Atlanta, Ga., Jan. 16-19; Tallahassee, Fla., Jan. 23-26; Montgomery, Ala., Jan. 30-Feb. 2; Jackson, Miss., Feb. 6-9; Baton Rouge, La., Feb. 13-16; Austin, Tex., Feb. 20-

23; Santa Fe, N.M., Feb. 27-Mar. 1; Phoenix, Ariz., Mar. 5-8; Sacramento, Calif., Mar. 12-15; Carson City, Nev., Mar. 19-22; Honolulu, Hawaii, Apr. 2-

Des Moines, Iowa, July 23-26; Madison, Wisc., July 30-Aug. 2; Lansing, Mich., Aug. 6-9; Harrisburg, Penn., Aug. 13-16; and Albany, N.Y., Aug. 20-23.



FAITH 7 ON TOUR—The spacecraft of Astronaut L. Gordon Cooper Jr., is shown while on display at the Illinois state capital, Springfield, in October, 1963.

5; and, Juneau, Alaska, Apr. 16-19.

The tour continues to Olympia, Wash., Apr. 30-May 3; Salem, Ore., May 7-10; Boise, Idaho, May 14-17; Helena, Mont., May 21-24; Salt Lake City, Utah, May 28-31; Denver, Colo., June 4-7; Cheyenne, Wyo., June 11-14; Pierre S.D., June 18-21; Bismark, N.D., June 25-28; Minneapolis, Minn., July 2-5; Lincoln, Nebr., July 9-12; Topeka, Kan., July 16-19;

Then the tour of Cooper's spacecraft continues in Montpelier, Vt., Aug. 27-30; Augusta, Me., Sept. 3-6; Concord, N.H., Sept. 10-13; Boston, Mass., Sept. 17-20; Providence, R.I., Sept. 24-27; Hartford, Conn., Oct. 1-4; Trenton, N.J., Oct. 8-11; Dover, Del., Oct. 15-18; Annapolis, Md., Oct. 22-25; and ending the 13 month tour it will be on display in Washington, D.C., Oct. 29-Nov. 1.

Nuclear Rocket Program Is Revised

The National Aeronautics and Space Administration and the Atomic Energy Commission recently announced a revision of the ROVER program, this country's nuclear rocket propulsion program.

The revised program places the emphasis on ground-based research and engineering and defers further development of flight systems.

This means that ROVER's Kiwi (Ground reactor) project is unchanged, that Nerva (Nuclear Engine for Rocket Vehicle Application) will be continued but with its flight objectives deferred and Rift (Reactor In-flight Test) is cancelled. Rift has been a technological project without actual hardware development to date.

AEC and NASA will concentrate on ground reactor and experimental engine research, development and tests with particular emphasis on analyzing and understanding power levels, temperatures, operating life and the problems of

frequent and reliable re-starts.

Work toward the development of the flight systems is deferred until the technology learned from the

Kiwi and Nerva projects has been satisfactorily established. The continuing projects will be directed toward ultimate use in flight systems.

Tracking Station Changes Made: New Site Added, Another Moves

The National Aeronautics and Space Administration recently announced the relocation of the Mucnea tracking station in Australia and an agreement with the Government of the Malagasy Republic for installation of a new station on the island of Madagascar.

Moving of the manned spaceflight tracking and data acquisition facilities to Carnarvon, Australia will consolidate at one site NASA's ground support facilities in Australia for the manned Gemini and Apollo projects.

The new site will also include tracking and data acquisition facilities for the unmanned Orbiting Geophysical Observatory series of scientific satellites. Installation of the transportable tracking station at Majunga, Madagascar will

provide a monitor for the "injection" phase of such satellites as NASA's Nimbus, Echo, and the OGO series. Injection is the crucial initial period when a spacecraft is placed into orbit by its launching vehicle, and commences operation.

The station will be operated by both NASA and Malagasy personnel and data obtained by the station will be made available to the Malagasy Republic and to the world scientific community.